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SCIENCE REVIEW OF THE YEAR

SCIENCE NEWS LETTER



Our Neighbors
See Page 403

A SCIENCE SERVICE PUBLICATION

PLANT PATHOLOGY

Another DDT Victory

The insecticide has been found successful in keeping down potato insect pest; treated plants thriftier, darker green than untreated controls.

► DDT HAS ADDED another of man's insect foes to its list of conquests. This time it is the potato leaf-hopper, serious pest in many commercial potato-growing areas. The story was told before the opening session of the American Phytopathological Society meeting in Cincinnati, by Dr. J. W. Heuberger and D. O. Wolfenbarger of the Delaware Agricultural Experiment Station.

The DDT was used as an addition to two different fungicidal sprays, as well as alone. It had no effect on the fungi that attack growing potato plants when used alone, but it did keep the number of leaf-hoppers down to less than a seventh of the number found on untreated control rows, when used either alone or mixed with the fungicides. DDT-treated potato plants, the two researchers reported, "were taller, broader, darker green in color; also, the leaflets were flatter (less cupped) than when

untreated or when the fungicides were used alone. No foliage injury was observed when DDT was used."

The same two workers also reported outstanding results with a new compound, zinc dimethyl dithiocarbamate, which had better effects than several of the best compounds now in general use against both the leaf-hopper and two destructive fungi, on tomatoes and potatoes. Dr. J. D. Wilson, of the Ohio Agricultural Experiment Station at Wooster, confirmed the fungicidal value of the same compound, as applied to celery, as well as potatoes and tomatoes.

Science News Letter, December 23, 1944

Sprouting Prevented

► POTATOES can be prevented from sprouting in the cellar by spraying them with the right kind of chemical compounds, John E. Thomas and Prof. A. J. Riker of the University of Wisconsin told the meeting. This natural but disadvantageous behavior of the tubers, late in the storage season, is the cause of large annual losses, which the experimenters were seeking means to prevent.

Best compound for the purpose, the two men found, is one of the growth-controlling hormones, the methyl ester of alpha-naphthaleneacetic acid. This can be applied as a spray, dust, or an emulsion. Nine-tenths of a gram per bushel is sufficient; which works out as about three ounces of the chemical for 100 bushels of potatoes.

Science News Letter, December 23, 1944

Elms "Vaccinated"

► ELM TREES were successfully "vaccinated" against a disease-causing fungus, known as *Verticillium albo-atrum*, by administering the liquid in which masses of the fungus had been grown, or by injecting an extract of the ground-up fungus itself, Dr. L. R. Tehon of the Illinois State Natural History Survey, stated in a paper before the same meeting.

When the trees were subsequently inoculated with quantities of the fungus spores they did not develop the disease.

In some cases the trees displayed symptoms reminding one of the anaphylaxis suffered by some persons receiving immunizing "shots," but in no case did wilting occur. In untreated control trees inoculated with the spores at the same time there was definite development of the disease, with pronounced wilting.

Science News Letter, December 23, 1944

Cabbage Plants Protected

► YOUNG CABBAGE plants were protected against another fungus enemy by means of benzene vapor, in experiments described before the meeting by Dr. H. H. Foster and Dr. J. A. Pinckard of the Mississippi Agricultural Experiment Station at Crystal Springs, Miss.

The seedling plants were kept under a close canopy of wet cloth. Suspended on threads were half-ounce wads of cotton, which were soaked in benzene three nights a week for a month. As long as the air over the plants was given this benzene treatment at these close intervals, the mildew disease could make no headway. As soon as the treatments were stopped, it became epidemic.

Dr. Pinckard succeeded in controlling a similar disease among tobacco seedlings by a benzene-vapor treatment, several years ago.

Science News Letter, December 23, 1944

GENERAL SCIENCE

Science Club in India Conducts Field Trips

► THIRTEEN boy scientists in India are conducting Americans in the Armed Forces on hiking and hunting trips. Seven Americans are included among the students of the Woodstock School at Mussoorie, United Provinces, India, who make up the group.

The boys range in age from 13 to 17. They are members of the first science club in India to affiliate with Science Clubs of America, the organization for the promotion of scientific activities for school-age boys and girls, which has 125,000 members in 5,000 clubs in this country.

For five months the club has been making displays of native mammals, reptiles, insects and plants under the direction of Robert L. Fleming, biology instructor. Now they have opened their headquarters to visiting service men and take these men on field trips to see the animals and plants in their native habitat.

Science News Letter, December 23, 1944



PREVENTS SPROUTS—The potatoes at the top have no sprouts though they were stored for a month. They were treated with the methyl ester of alpha-naphthaleneacetic acid. The potatoes at the bottom were not treated.

GENERAL SCIENCE

Carnegie Reports

Annual round-up tells of nebulae resolved into individual stars, better rangelands in the West, and further results with chlorellin, antibacterial substance.

See Front Cover

➤ **PERHAPS** the most interesting astronomical result of the past year has been the resolution into stars of several extragalactic nebulae, among them the two companions of the Andromeda nebula and the central region of the Andromeda nebula itself. This is described in the new yearbook of the Carnegie Institution of Washington.

Photographs taken on red-sensitive plates with Mount Wilson's 100-inch telescope by Dr. Walter Baade have for the first time resolved into stars such nebulae as Messier 32 and those known by the New General Catalogue Numbers of 205, 147 and 185. Previous to this, NGC 147 and 185, shown on the cover of this *SCIENCE NEWS LETTER*, were not known to belong to the group of galaxies which, relatively speaking, are close neighbors to our own universe. Messier 32 and NGC 205 probably accompany the Andromeda nebula in its travels through space, Dr. Baade's work revealed.

Science News Letter, December 23, 1944

Ex-Nova for Companion

➤ **THE BLUE** companion of R Aquarii is an ex-nova, investigations conducted by Dr. Rudolph Minkowski of Mount Wilson Observatory showed. Measurements of a pair of plates made 16 years apart indicated that the nebulosity seen around R Aquarii was ejected 600 years ago. With its low velocity of ejection, the blue companion of R Aquarii is believed to be related to the recurrent novae RS Ophiuchi and T Pyxidis.

Science News Letter, December 23, 1944

Better Rangelands

➤ **BIGGER** and better bluegrass stands will some day wave over rangelands in the West, now depleted through overgrazing and drought. Creation of the new kinds of grasses through hybridization is described in the new yearbook.

One of the species used in the new hybrids is a giant grass, reaching a height

of six feet, that grows in parts of the Pacific Northwest. Crossed with the more conventional kinds of bluegrass, it contributes something of its size and rapidity of growth, besides other desirable characteristics, states Dr. H. A. Spoehr, chairman of the division of plant biology.

The breeding of new kinds of range grasses is being conducted as a joint project with the U. S. Soil Conservation Service, with Dr. Jens Clausen, Dr. David D. Keck and Dr. William M. Hiesey carrying on the field work, mainly in the Pacific Coast states. Once a desirable new grass species has been obtained, it is propagated by stolons or runners; this asexual reproduction preserves the valuable hybrid properties against loss

through segregation, which would occur if seeds were depended on.

Science News Letter, December 23, 1944

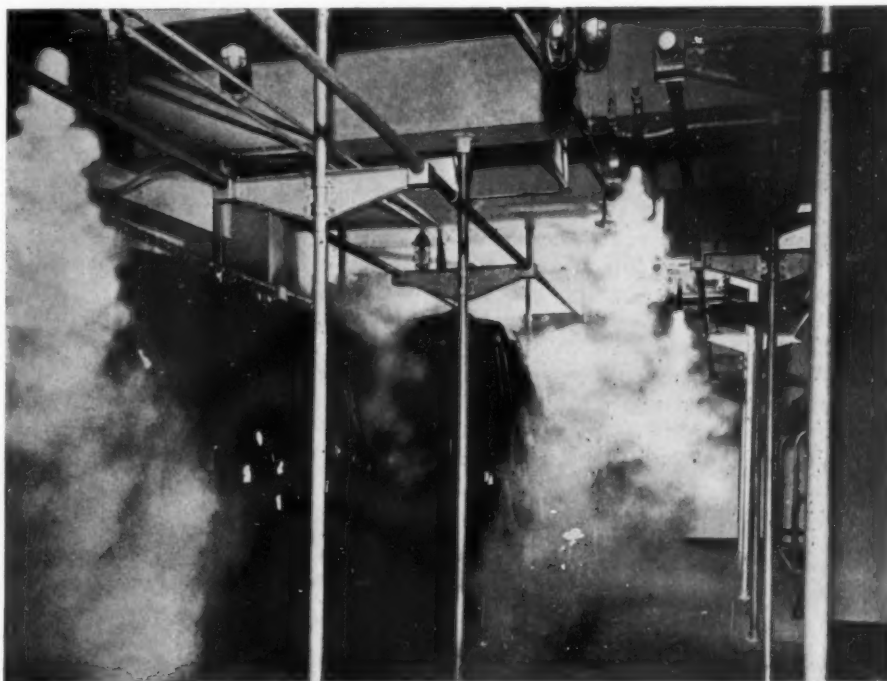
Chromosomes Doubled

➤ **BREEDING** plants to produce higher yields of useful substances, and lower percentages of harmful drugs, occupied the attention of Dr. H. E. Warmke and Harriet Davidson, of the Institute's division of genetics. Carrying on from preliminary results obtained a year ago, they found that they could get bigger roots, containing a higher percentage of rubber, from the Russian dandelion, *koksaghyz*, if they subjected parent plants to chemical treatment that doubled the number of chromosomes in the cells of the offspring.

Science News Letter, December 23, 1944

Chlorellin Hits Bacteria

➤ **FURTHER** results with chlorellin, the antibacterial substance produced by the green alga, *Chlorella*, are announced in the yearbook by Dr. H. A. Spoehr, Dr. J. H. C. Smith, Dr. H. W. Milner



NOT A LEAK!—This is friendly, fire-smothering carbon dioxide gas pouring out of ceiling nozzles to protect precious fur coats hanging in a storage vault. It is released automatically from high-pressure storage cylinders when the first warning drift of heated air touches a special heat detector. Walter Kidde & Co., who designed this newest protection for the minks and sables which are not easily replaced today, have also harnessed the same gas for use as a fire-extinguisher in planes, ships and tanks, and to inflate rubber life-rafts and lifebelts.

and Dr. G. J. Hardin. Chlorellin was found able to stop the growth of a strain of *Staphylococcus aureus*, the boil bacterium, that had become resistant to the action of penicillin.

Science News Letter, December 23, 1944

Artistic Indian Sandals

► INDIANS living in North America from the third to the twelfth century A.D. expressed their craving for beauty not by constructing magnificent monuments or by molding elaborate pottery, but by making sandals of intricate design, states Dr. E. H. Morris, who directed the study.

Many of the cross-woven sandals, with their flat soles of tight, hard fabric, are made entirely of yucca fiber. Others, however, used yucca only for the warp and made the weft of such materials as Indian hemp, human hair and, in more recent times, even cotton. These were dyed yellow, several shades of red, brown, or black.

In many of the sandals found in Arizona, Utah and New Mexico, supplementary warp and weft were wrapped and twisted about one another, resulting in a two-ply fabric held together only by occasional loops.

Science News Letter, December 23, 1944

Columns and Altars

► THE DISCOVERY of new stelae and altars in Chiapas, Mexican state near Guatemala, by Dr. and Mrs. S. G. Morley, and correcting readings on two of the ancient columns, extends backward some 50 years, to about 475 A.D., the dating of monuments in this region that were known to have been created at a definite period.

On the basis of these dated remains, this makes Altar de Sacrificios, which lay at the crossroads of the Old Empire, 40 years earlier than any other known city in the Usumacinta Valley. It also again raises the unsettled question, Dr. Morley states, of just what route Maya culture followed in reaching this valley.

Good evidence was found that the Maya used rebus writing, where words or phrases are expressed by pictures of objects whose names resemble these words or the syllables of which they are composed. J. E. S. Thompson advanced evidence that the symbol for counting was the figure of the mythical fish called "xoc," since this and the Yucatec word "xoc," meaning "count," sound alike.

Science News Letter, December 23, 1944

MILITARY SCIENCE

Oil Bomb Damages City

Known as the M69, this terrifying new weapon is credited with creating a fire that all but destroyed the northwest section of the city of Changsha, held by the Japs.

► A TERRIFYING new six-pound oil bomb, known as the M69, is credited with creating a fire that all but destroyed the northwest section of the city of Changsha, China, now occupied by the Japanese, the first time it was put into use, last July.

Landing in the streets and on rooftops, the bomb spits chunks of flaming oil up to 25 yards in all directions. These flaming chunks of oil cling to the surface of whatever they strike, making them one of the most effective fire-starters developed in this war. The glow against the sky above Changsha was visible to Army Air Force pilots for 80 miles, and columns of black smoke could be seen rising more than half a mile.

The new fire bomb, developed by the Chemical Warfare Service, consists of a slender six-sided steel case 19 inches long and no bigger around than a baseball bat. The center portion of the cylinder holds a cheesecloth sock containing about three pounds of gasoline blended with a thickening compound. This mixture looks like orange gelatin, and it burns at a temperature of about 3,000 degrees Fahrenheit.

The thickened oil is similar to that used in Army flamethrowers. Each bomb holds enough of the jelly-like substance to make a flaming flapjack a quarter of an inch thick and a yard in diameter.

White cloth streamers, packed in the tail, act like parachutes to slow the descent of the bomb so that it will not smash to bits when it lands, and yet leaving it with sufficient force to pierce roofs covered with tile, slate, wood, galvanized iron, or composition shingles.

In about five seconds after the bomb lands, a delayed action fuse spits out the cheesecloth sock from the tail of the bomb and ignites it. The bomb burns for 8 to 10 minutes. The bombs are dropped from planes in clusters of 38. A total of 78 clusters of the M69 bombs were used in the Changsha raid.

The M69 is an outgrowth of research dating back to 1941 to discover a substitute incendiary mixture at a time when large quantities of magnesium for incendiary bombs were not available. The Office of Scientific Research and

Development and the Chemical Warfare Service worked out the petroleum-base incendiary compound. After exhaustive tests, both the mixture and the bomb design were standardized.

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GENERAL SCIENCE

Science Speeds Victory

Science Review for 1944 shows jet-propulsion, rocket bombs, DDT, and the B-29 Superfortress have top billing among the year's advancements.

This summary of the year's happenings in the world of science is limited by space to just the highlights. Most of the events are described in detail in the pages of the SCIENCE NEWS LETTER for the current year. If you wish to refer to any particular report you may find it readily through the index. (See SNL, June 24 and also the issue which will appear next week, Dec. 30.)

By SCIENCE SERVICE STAFF

► JET-PROPULSION, rocket bombs, DDT, and the B-29 Superfortress get top billing in 1944's science and technology. There were scores of other important developments that came to public

attention, some of them under secret development before this year and announced only after they were put into use.

Science continued to contribute to the winning of the war and to the making of the peace. There was considerable thought as to reconversion of science and technology to the postwar world while uninterrupted research for the fighting forces continued.

Health advances were led by the remarkable effectiveness of DDT against insects, and the expanding usefulness of penicillin in treating many diseases, surpassing even the record of the sulfa drugs.

New materials and new processes that will prove of continuing usefulness were made known, among them the methylolurea impregnation of wood that converts soft woods into hard ones, the silicone family of synthetic resins that waterproof and insulate various materials, and chemical treatments to make stockings runless and clothes wrinkleless.

A camera photographed the floor of the ocean and a new gigantic calculator went to work.

Human blood was made to yield a measles preventive, a surgical plastic, a skin grafting material, and a substance to prevent bleeding, as well as albumin for shock.

Within secret laboratories scientists and engineers continued to work on new inventions, devices and processes for war and victory, but many of the advances made will not be announced until future years.

The detailed annual Science Service survey of the year's progress in science and technology follows:

AERONAUTICS

B-29 Superfortress Put Into Service by the Army

► THE B-29 Superfortress, speedy, long-range battleship of the air, was put into service by the Army.

The CW-20E, luxury airliner version of the military transport, was designed to meet the needs of medium-range airline operations; the cross-section of the fuselage is shaped like a figure-8 to permit maintaining constant atmospheric pressure and oxygen supply regardless of altitude.

The C-82 cargo plane, utilizing the twin-boom tail, was developed to carry heavy loads of troops and supplies to points where other cargo planes cannot land.

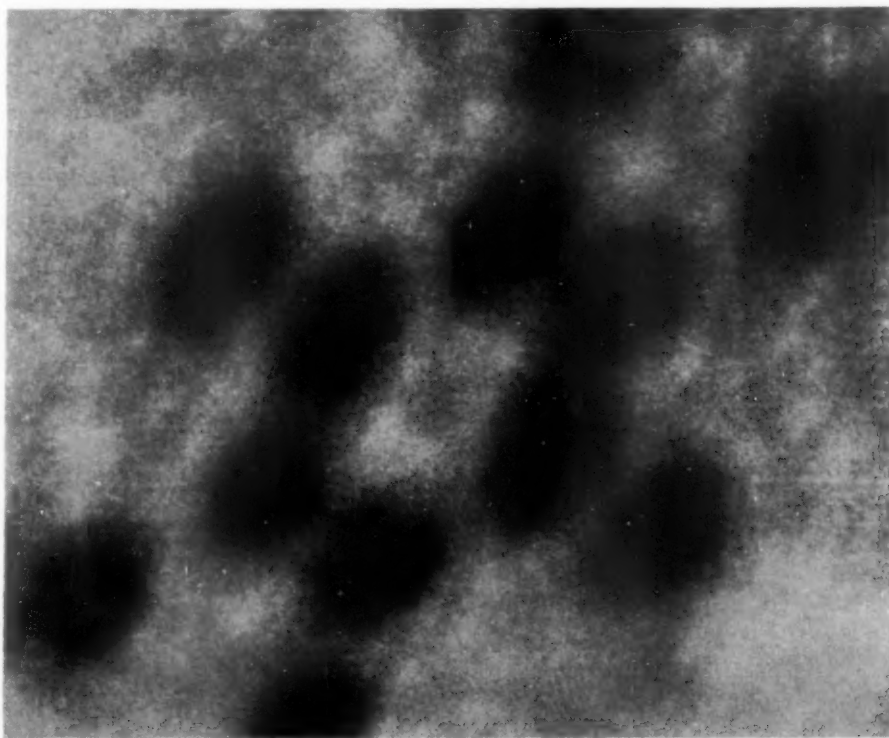
A droppable fuel tank attached to the wings of aircraft was announced which increases the operational range 60% with only a 2% decrease in top speed.

The stabilizing device for helicopters, placed between the mast and the rotor to keep the rotor in a horizontal plane regardless of the angle of the fuselage with the earth, was announced.

Jet-propulsion was used for fighter plane power for high speed, high altitude operation, and jet boosters for lifting heavy aircraft off the ground during takeoff.

Jets of air were discharged at the tips of rotor blades of helicopters to improve the efficiency of the vertical climb aircraft.

An electrical de-icer for airplane propellers was devised of three layers of synthetic rubber, the center layer being an electricity-conducting rubber containing a continuous chain of carbon particles.



PORTRAIT OF THE INVISIBLE—By a new development of the Bragg method, this picture has been made of a single molecule of hexamethylbenzene, a coal tar derivative, magnified about 200,000,000 times. It turns out to look like molecular patterns drawn from theory, except that the three hydrogen atoms known to cling to each of the six carbon atoms of the outer ring do not show because they have only one electron. The process developed by Eastman Kodak Laboratories involves making an X-ray diffraction photograph and then, with the information it provides, drawing a series of interference patterns which are then photographed in suitable combinations to give the picture shown.

A large cargo airplane of stainless steel construction was successfully tested.

A "sky-hook," which causes packages to spin as they fall, was developed to make packages dropped from planes land almost directly beneath the point of release.

Use of new bonding material in the sand-wich construction of airplanes made possible a light, inexpensive plane for private use.

The Black Widow, P61, large and most powerful long-range pursuit plane, was put into service for night fighting.

The Army's A-26 fighter-bomber, the Invader, was designed with an all-purpose nose that makes it possible to equip the plane on the production line with special devices in addition to standard armament.

A Navy blimp was equipped with reversible propellers which can be used as brakes.

The P-63, an all-metal, low-winged fighter plane with more power and greater range and speed than its predecessor the P-39, was developed.

An improved oxygen supply system, developed for aircraft, utilizes a regulator controlled by atmospheric pressure which automatically delivers increasing quantities of oxygen to the mask as the pressure decreases.

A water injection device was developed to give an extra burst of power to an airplane engine.

A light-weight passenger seat for aircraft, saving over 157 pounds of weight in a 24-passenger plane, was developed.

A self-propelled aircraft electric generator power plant, mounted on a three-wheeled scooter, was developed to speed the starting of airplane engines.

Red-lighted instrument panels, a military development to prevent interference with night vision, were installed in commercial planes.

The performance of the big, heavy single-engine P-47 Thunderbolt fighter was improved and its radius of operation increased.

A high-frequency, all-direction radio range, believed to be static free, and which enables a pilot to select any course toward or away from it, was developed.

Stall-warning devices for private airplanes were perfected.

Giant, 18-foot, hollow steel airplane propellers satisfactorily passed service tests.

ANTHROPOLOGY-ARCHAEOLOGY

Bone Fragments Indicate Huge Ice Age Giants

► REASSEMBLY of bone fragments led to the announcement that Javanese giants with jawbones much larger than those of any known human beings, living or extinct, lived during the Ice Age.

Ancient clay tablets from the Near East, deciphered for the first time, describe a Babylonian mythological hero pleading with the god to grant life everlasting, and are the oldest known written record of man's longing for immortality.

Identification of plant pictures in the Voynich manuscript showed it could not have been written by Roger Bacon, its supposed author, since at least two of the plants illustrated were unknown in Europe until after Columbus' return from the New World.

Pollen grains found in successive layers of peat and muck in Danish swamps indi-

cated that New Stone Age farmers cleared away the major forest trees.

Stories about Yurikawa, legendary hero of Japan, were reported to have been borrowed from Homer's immortal Odyssey.

Evidences found in old Indian graves and dwelling sites suggested that the cultivation of such vegetables as squashes and pumpkins was started quite independently by different tribes.

Prehistoric skulls with filed teeth were discovered for the first time in the Mississippi valley.

ASTRONOMY

Saturn's Largest Moon Has Observable Atmosphere

► SUCCESSFUL photographing of the spectrum of Titan, Saturn's largest moon, showed it to have an atmosphere of methane and possibly ammonia, making it the only moon in the solar system known to have an observable atmosphere.

The discovery of two new members of our local group of galaxies brought to 13 the number of universes known to be our close neighbors.

Two double stars in the constellation of Cassiopeia were found to be surrounded by thick nebulous envelopes; their approximate size and ellipticity were found to be less in photographic light than in visual light.

New comets discovered were: du Toit II, Van Gent II, Berry; Comet Van Gent I was rediscovered by Peltier after being lost for about a month.

The orbit of the earth was shown to revolve in keeping with predictions of relativity theory.

The total eclipse of the sun on Jan. 25 was studied by an expedition of Mexican astronomers in Chiclayo, Peru; astronomers in Lima reported the eclipse lasted three seconds less than predicted.

Stars of the Pleiades were discovered to be receding from the solar system at a speed of about five miles each second.

A star was discovered of such extremely low luminosity that a million stars like it would be needed to equal our sun's brilliance.

An old nova in the southern constellation of Pictor was found to have become decidedly elongated since it brightened to first magnitude about 20 years ago.

A red giant, millions of times larger in volume than our sun but of such low density it is practically a luminous vacuum, was discovered through the use of an optical defect in refracting telescopes which makes it possible to take photographs alternately at the red and blue focuses of the telescope.

Nine-tenths of the stars in our galaxy were reported to be closer to its center than is our sun.

The atmosphere of the moon, if any exists, was estimated to have an upper limit in mass of one-millionth that of the earth.

The path of the Indiana-Illinois-Ohio fireball of Aug. 18, which exploded in daylight at a height of 10 to 20 miles, was traced.

A double star in the southern constellation of Antlia was discovered to be composed of two white dwarfs.

Evidence indicated that a star in the constellation of Libra has an intensely bright stratum of hydrogen just above its luminous, incandescent surface.



NORDEN BOMBSIGHT—With the publishing of this Army Air Force photograph, the cover of secrecy is lifted from America's unparalleled aerial weapon. (See SNL, Dec. 9).

Predictions were made that the next period of sunspot maximum would occur early, sometime before May, 1948.

Single-sun stellar systems such as ours were reported to be the exception rather than the rule.

The Mexican Government awarded to Dr. Harlow Shapley, director of Harvard Observatory, the Order of the Aztec Eagle, third class, for aid to Mexican astronomy.

BIOLOGICAL SCIENCES

Crown Gall of Plants Cured by Penicillin

► CROWN gall of plants, often called plant cancer, was cured by the application of crude penicillin.

Tristeza, extremely destructive disease of citrus trees, was given its first full description in English and Portuguese by an American plant pathologist.

Chlorellin, new antibacterial substance related to penicillin and similar in its action, was discovered in a common one-celled freshwater alga, which manufactures its own substance out of natural raw materials.

A germ-stopping substance, streptomycin, which gives protection against fowl typhoid, was found in soil micro-organisms.

DDT successfully wiped out gipsy-moth caterpillars on a test woodland tract.

A mold that lives in the soil was reported to catch and devour insect prey.

Production of new hybrids was facilitated by the discovery of a strain of onions with exclusively female flowers and tomato plants having pollen-less flowers.

Ultraviolet rays were used to produce new strains of molds; some were changed in appearance; others underwent internal changes although they looked the same.

Discovery in Peru of chimney swifts wear-

ing bands put on their legs in the United States solved the mystery of where these birds go for the winter.

The aerosol method for spraying an exceedingly fine mist was successful in distributing growth-control substances to secure seedless fruit from unpollinated flowers.

A new strain of food yeast, which promises to be a quick-producing source of edible protein since the cells are twice the size of its parent species, was developed through the use of camphor vapor.

Gelatin capsules containing necessary nutrients were used as micro-greenhouses in growing tiny plant embryos, too feeble to sprout out of the seeds in which they are formed or to produce their own roots.

Natural gas, unlike manufactured gas, was found harmless to potted plants and cut flowers.

A hybrid gibbon was born in captivity to a Siamese gibbon mother and a Sumatran gibbon father.

Statistical analysis of the phrase order in the song of a wood pewee indicated that birds are conscious composers.

An easily-grown mold proved to be a good test plant for fertilizer elements needed by crop and garden plants.

Large reductions or increases in the amount of light were found to cause weasel pelts to change to white or brown by a complete shedding of the previous coat.

Low-acid peaches for persons with gastric ulcers resulted from a 15-year plant breeding program just completed.

A school of Pan-American agriculture was formally inaugurated in Honduras.

Lettuce seeds were made to sprout in soil at midsummer temperatures by soaking them in a solution of thiourea.

The Stephen Hale Award in plant physiology was given to Dr. Ray F. Dawson of Princeton University.

Prof. N. G. Cholodny of the University of Kiev, was awarded the Charles Reid Barnes Life Membership in the American Society of Plant Physiologists.

The Sir William Schlich forestry medal was given to Prof. Henry S. Graves, emeritus dean of the Yale School of Forestry.

Recipients of the Daniel Giraud Elliot gold medal of the National Academy of Sciences in recognition of outstanding publications in zoology or paleontology were: Prof. Malcolm R. Irwin, University of Wisconsin (for 1938); Prof. John H. Northrop, Rockefeller Institute of Medical Research (for 1939), and Prof. William Berryman Scott, Princeton University (for 1940).

CHEMISTRY AND PHYSICS

Mathematical Robot Solves Intricate Problems

➤ A MATHEMATICAL robot, an automatic sequence control calculator which can perform a series of operations without resetting, making possible calculations formerly impracticable because of the time required, was put into operation.

Completion of a 225-ton cyclotron, one of the two largest in the world and capable of generating atom-smashing projectiles of 15,000,000 electron volts energy, was announced.

By impregnating wood with methylolurea

in water solution, it was found possible chemically to convert soft woods into much harder grades.

A continuous polymerization process was developed to replace the older batch type of synthetic rubber production, making possible an estimated 40% increase in output.

Milling time was cut by a new method of mixing carbon black with synthetic rubber in the liquid state instead of later.

An electronic device which registers the speed of flight of ammunition accurately to 1/100,000 of a second was developed.

A new family of synthetic resins, called silicones, for waterproofing and fireproofing materials, was produced by combining slippery organic compounds with the gritty components of sand and glass.

Quinine was synthesized from a coal-tar derivative.

Independent development of two 2,000-000-volt X-ray tubes made possible X-ray pictures through extremely thick sections of steel and also wider applications of X-rays in medical research.

Chemical treatments were developed to make stockings runless, trousers remain creased and dresses that will not wrinkle.

Sawdust and sawmill wastes yielded a new plastic, acetic acid, industrial alcohol and several chemicals by means of a continuous method of chemically adding water to wood.

A method was developed for using lignin wastes from sulfate paper mills to bring about the formation of useful granules in the soil; a black opaque plastic of high tensile strength and good resistance to moisture was made from wood shavings and sawdust.

Two new kinds of synthetic rubber were developed, one from lactic acid and the other from butadiene and dichlorostyrene.

Electronic heating was used to give a permanent set to the twist in rayon cord, making the cord stronger and safer for use in tires.

An electronic cyclograph was used to determine rapidly whether a piece of metal meets hardness specifications.

An electroplating process for copper-plating was devised which speeds up production by using potassium salts in the bath.

An electron spectroscopy was used in combination with an electron microscope to identify chemical elements composed of sub-microscopic particles; it was used with a three-dimensional polaroid vectograph to obtain three-dimensional views of sub-microscopic structures.

Chlorine dioxide, powerful oxidizing and bleaching agent, was produced by a new dry process which depends upon the reaction of chlorine and sodium chlorite.

Wood veneer was bonded to metal surfaces by a rubberlike adhesive.

Itaconic acid, a chemical used in the production of plastics, was made by fermenting corn sugar with a mold.

New knowledge of the chemical constitution of coal was obtained by studying the quantity of methane it contains.

Fluorescent pigments of zinc and cadmium sulfide were added to paper while still in the pulp stage, eliminating the need of special inks for fluorescent maps.

A glass highly resistant to hydrofluoric acid was developed.

Increased production of vitamin C, or ascorbic acid, was made possible by a new method of making it from the galacturonic acid in sugar beet pulp.

Heating in automobile tires made of synthetic Buna rubber was diminished by the addition of certain non-black pigments of fine particle sizes.

A plastic was developed which in manufacture is expanded to many times its original size; it is lighter than cork and lower in heat conductivity than rock wool or glass.

A heat-resistant plastic, dichlorostyrene, was developed for use in electrical insulation.

A high-speed panchromatic film was developed for taking pictures under extremely adverse light conditions at high shutter speeds.

Starch and protein grains in bread, put into the tombs with Egypt's ancient mummified dead, were found to be still in good chemical condition.

X-rays were used to keep uniform the thickness of white-hot sheets of steel squeezed out between rollers.

Rubber and resins were bubble-floated out of the mashed pulp of milkweed and other plants by a process similar to the flotation method of separating metals from their ores.

X-ray can be used to change the rate of oscillation in quartz crystals used to control radio transmitters, thus tuning the plates, it was reported.

A high-pressure mercury vapor lamp was developed which permits the operator to adjust the light intensity at various levels in printing motion film sound tracks.

A color film that can be processed at home in 90 minutes was made available to the public.

A heat-resistant plastic, a readily moldable synthetic co-polymer containing carbon, hydrogen and nitrogen, was developed to withstand heat of boiling-water temperature.

A resin compound which makes soil waterproof, thus eliminating mud, was announced.

Improved processes for obtaining from coal chemicals similar to those extracted from petroleum were developed.

Synthetic menthol which resembles the natural product in chemical structure was produced from thymol.

Post-graduate fellowships in physics mathematics and chemistry were established in honor of Dr. Frank B. Jewett, \$3,000 a year to be given to each recipient and \$1,500 to the institution at which the work is done.

Dr. Isidor I. Rabi of Columbia University received the 1944 Nobel award in physics for investigating magnetic and electric properties of the atomic nucleus by means of the "magnetic resonance method"; Dr. Otto Stern of the Carnegie Institute of Technology received the 1943 Nobel prize in physics for his studies of the structure of the atom by means of the "molecular beam" method.

The 1943 Nobel prize in chemistry was awarded Prof. Georg von Hevesy of the Danish Institute of Theoretical Physics, Copenhagen, for work in the use of isotopes as indicators in studying chemical properties.

Dr. William Mansfield Clark of the Johns Hopkins University, who has worked on the precise determination of the acid or alkaline state of milk, received the Borden Company prize of \$1,000.

Dr. Joseph S. Fruton of the Rockefeller Institute for Medical Research received the \$1,000 Eli Lilly and Co. prize in biological chemistry for studies of the amino acids.

Dr. Elmer K. Bolton, chemical director of

the du Pont Company, was awarded the Perkin medal by the American Section of the Society of Chemical Industry.

Dr. Arthur C. Cope of Columbia University was presented the American Chemical Society award of \$1,000 in pure chemistry for researches on vinyl and allyl chemical types in plastics and drugs.

Dr. William David Coolidge of the General Electric Co., and Dr. Peter Kapitza of the USSR Academy of Sciences, were awarded Franklin medals by Franklin Institute.

Dr. Robert Clark Jones was awarded the Adolph Lomb medal for developing a system of mathematical calculation for optics which made possible an optical gunsight for bazookas.

Col. Bradley Dewey, former U. S. Rubber Director, was awarded the annual Chemical Industry medal for his work in colloid chemistry, especially pertaining to rubber.

EARTH SCIENCES

Underwater Camera Shows New Features of Ocean

► A CAMERA developed for taking pictures of the ocean's floor disclosed hitherto unknown features in the life and geological processes on the ocean bottom; flashlights are set off and the camera shutter clicks when the tip of a special trigger hanging from the bottom touches the floor.

Among several damaging hurricanes was an unusually severe one that caused death and destruction along the Atlantic seaboard the middle of September, beginning somewhere in the Atlantic, off the West Indies.

Seismologists located epicenters of 33 distant earthquakes through correlation of seismographic data; notable among them were two in Turkey in the same general region, and earthquakes in Argentina, southern Mexico, northern New York, and one that shook the southern islands of Japan, comparable to the 1923 quake there.

A new electronic amplifying device, operated by batteries, was developed to magnify and record near and distant earthquakes.

The Mississippi Valley suffered from floods during the spring; at St. Louis flood waters reached a height of 39.1 feet, highest since 1844.

A fossil cactus of Eocene date, similar to the modern prickly pear, was found in the rocks of Utah.

A tectonic map of the United States, depicting its complete geologic structure, was completed.

A diamond weighing 34.46 carats, second largest ever discovered in the United States, was reported found in West Virginia.

A 200-million-year-old fossil jaw, complete with 53 teeth, was discovered near Philadelphia—relic of 10- to 20-foot crocodile-like reptiles that haunted swamps and lakes during the Triassic period.

The discovery of thick beds of potash-containing minerals underlying a large area in eastern Utah substantially increased America's known reserves of potash.

Conifer pollens found in an ancient bog indicate that Texas once had a climate resembling that of the present Great Lakes region.

Bones of a mastodon, primitive Ice Age elephant, were found in Ohio.

The enemy in Holland flooded farm land to the extent of at least 375,000 acres, a major disaster affecting at least 15% of Holland's farm land; some of the flooding is with salt water which will make the land useless for farming for many years.

A process was developed for producing pure tungsten directly from tungsten ore of all grades, thus eliminating the necessity of transforming tungsten in the ore used into alkali tungstate.

The Mary Clark Thompson gold medal of the National Academy of Sciences for outstanding work in geology and paleontology was awarded to: Prof. Edward W. Berry of the John Hopkins University (for 1942); Dr. George Gaylord Simpson of the American Museum of Natural History (for 1943), and Prof. William J. Arkell of Oxford University (for 1944).

ENGINEERING AND TECHNOLOGY

Anthracite Furnace Has New Burning System

► A NEW anthracite furnace made use of a steel tube as combustion chamber, a worm for fuel feeding, air drawn through by suction pump for draft and a water jacket surrounding the tube to transmit the heat.

Gas turbine engines for aircraft, railroad trains and automobiles developed several thousand horsepower as a result of improvements in metals and efficiency, offering a large saving in fuel and weight for long-range operation.

Larger television pictures were made possible by the development of high-voltage cathode-ray tubes capable of producing extremely bright pictures.

A device was invented that can be installed in a jeep or other vehicle to plot the course traveled by the automobile as it speeds over highways or across terrain.

A two-way electronic train telephone system enabled freight conductors and engineers to talk with each other from opposite ends of a train.

An electrolytic process was developed for rapidly depositing a tin coating of any desired thickness on any gauge of electric wire without producing a copper-tin alloy on the wire.

A nylon compound coating on electric wire, applied by an extruding process, was found to be tough, abrasion and heat-resistant, and impervious to most solvents.

Pilotless jet-propelled planes carrying large explosive charges, nicknamed "buzz-bombs" and "robot bombs," were used by the Germans in long-range attacks.

The V-2 stratosphere rocket, a spinner using nine tons of fuel and carrying one ton of explosive, was developed to follow a parabolic trajectory that has its peak 60 miles up and a top speed of 1,000 to 3,500 miles an hour.

A miniature seven-pound electric motor which operates at 120,000 revolutions a minute was developed.

Porcelain enamel that can withstand extremely high temperatures was developed and used on warplane exhausts.

An explosive 20% more powerful than TNT was made by nitrating an alcohol which in turn is made by treating a mixture of formaldehyde and acetaldehyde with lime.

An electronic "ear" was devised to test shells for imperfections by recording the sound made when the shells were dropped on an anvil.

Chrome-plated cylinder barrels gave longer service life to automobile engines.

Columbium metal was obtained in high-purity form by heating columbium carbide and columbium oxide in a vacuum.

The double process of chromium plating and soaking in hot oil to release hydrogen was discovered to lengthen the life of cutting tools for machine shops.

A three-metal electrolytic plating process was developed which used copper-tin-zinc alloy as the anode, and a special salt in the bath.

The "Crocodile" flame thrower, using a new type of fuel, shot a stream of fire 450 feet.

Fighting armored tanks fitted with bulldozer blades that can be discarded before combat were used as dual-purpose machines.

The noise made by primers on hand grenades was diminished by a new primer containing milder detonating ingredients.

Midget M2 fog generators were used to produce a concealing white cloud in warfare.

Rockets, known as flying bazookas, were discharged from tubes placed under the wings of warplanes.

"Speed-up" motion pictures in color were used to study combustion efficiency in stoker fuel beds in furnaces.

Sound waves were used to test the elasticity of fabric yarns by setting up a vibration in a steel bar attached to the fiber and measuring the velocity of sound passing through the fiber.

Aluminum alloy landing mats, weighing 50% less than steel mats, were used for emergency flying fields.

Fuel tablets, made of a synthetic compound known as trioxane were developed to heat food for soldiers.

Good coke was made from Colorado coal by adding in the coking process a char made from similar coal by driving out part of the volatile matter.

Development was announced of an Army vehicle, called the "weasel" which carries men or cargo over snow, mud and other treacherous ground, and climbs a 45-degree slope.

A fire bomb, which upon contact spits flaming oil in all directions, was developed to start fires in enemy territory.

The Edison medal was awarded to Dr. Vannevar Bush, president of the Carnegie Institution of Washington, for contributions in electrical engineering.

The Faraday medal of the British Institute of Electrical Engineers was awarded Dr. Irving Langmuir of the General Electric Research Laboratory.

The John Fritz medal, given in recognition of distinguished contributions in the field of applied science, was awarded to John L. Savage, for many years designing engineer of the U. S. Bureau of Reclamation and consulting engineer for the Tennessee Valley Authority.

INVENTION

Industrial Inventions Outstanding This Year

► NOTABLE and interesting inventions patented during the year include:

A process for enriching blast-furnace gases so they may be better used as a source for commercial chemicals such as ammonia.

A process for the synthetic production of toluene from benzene and methane.

A process for making synthetic liquid fuels and oils out of cheap gases.

A method for recovering small nuggets of steel embedded in old furnace slag.

A process for transmitting color pictures by wire or wireless in the form of three-color separation films ready for the usual photographic processing.

A new type of giant locomotive, built in three sections to get around curves, with two fuel-and-water tenders and two sets of driving wheels.

An apparatus which substitutes air pressure for gravity in administering blood plasma to the wounded in battle.

A space-saving cathode tube for use in electron microscopes and television sets.

A camera latching mechanism that prevents double exposure.

A fuel injector for internal combustion engines that injects the fuel at a relatively constant rate irrespective of the speed of the engine or amount being injected at each stroke.

A process for cracking naphtha and rearranging its atomic fragments into aviation gasoline in the presence of a synthetic silica alumina catalyst.

An ozone treatment to protect meat against spoilage, the ozone being generated by ultraviolet radiation.

Use of one of the chemicals of the chlorophenol group to protect green lumber against fungi while under treatment to prevent cracking and splitting.

A system of illuminating airfields by underground lights, eliminating overhead flood lights and superstructures.

A series of double salts of nicotine for insect-fighting, to replace the unstable simpler nicotine salts formerly used.

An airplane combining the advantages of conventional propellers and the newer jet propulsion.

A simple dashboard instrument for airplanes that shows climb and drop quickly and sensitively.

An infra-red bread-baking machine that cooks loaves evenly in 20% to 30% less than the usual time.

MEDICAL SCIENCES

DDT Hailed as Great Contribution to Health

► THE INSECTICIDE, DDT, was hailed as a contribution to world health, following Army experience in which it checked a louse-borne typhus epidemic when dusted as a powder in mass delousing of civilians and aided in control of malaria when used as an anti-mosquito spray.

Blood protein derivatives were put to many new uses; gamma globulin to prevent measles, albumin for shock, fibrin foam to stop bleed-

ing, fibrin film (a plastic) to repair the tough cover of the brain, and fibrinogen with thrombin for cementing skin grafts in place.

A paste of red blood cells salvaged from plasma production was reported to give good results in speeding the healing of old, infected burns, varicose and other ulcers, and extensive granulating wounds.

Thanks to mobile surgery and reconditioning treatment, 97% of the wounded soldiers recovered and about one-half of these returned to duty; death rates from disease among the fighting forces were lower than the annual death rate in the Army during any one of the last 10 years of peace.

Ultraviolet radiation of barracks reduced respiratory illness by one-fourth.

Daily doses of sulfadiazine cut down meningitis, scarlet fever and streptococcus sore throat, and subsequent attacks of rheumatic fever in Army and Navy camps; care was necessary, however, to prevent harm from the sulfadiazine treatment itself.

The spread of colds and other air-borne diseases can be checked by the vapor of triethylene glycol, a large-scale test in a military camp showed.

Faulty function of the cortex of the adrenal glands was seen as a possible cause of leukemia.

Penicillin showed possibilities as an effective remedy for relapsing fever, Haverhill fever, parrot fever and erysipeloid; the drug proved effective in preventing peritonitis and in treating syphilis.

Sulfa-resistant gonorrhea was successfully treated in six hours with penicillin.

Experiments with mice led to the hope that anthrax may yield to penicillin.

The action of penicillin was prolonged by mixing it with beeswax and oil; elimination of penicillin via kidneys was slowed by the use of para-aminohippuric acid, and

also by chilling the tissues into which it was injected.

The production of penicillin was speeded by the use of radium and also by placing strips of cellophane in the culture medium; radio heat proved to be 48 times as fast as the old "freeze-drying" method for drying the drug.

Human ova were fertilized outside the body and their development through the first two cell-division stages observed.

Isolation of the growth-stimulating hormone from the pituitary gland was announced.

Aid to the diagnosis and prognosis in diseases of circulation, including immersion foot, was found in the use of radioactive sodium for measurement of circulation time.

Discovery was reported of a unique protein, apoferritin, that acts as an iron storage depot for the body, the stored iron having a magnetic susceptibility of a magnitude rare in iron compounds.

A chemical, named pyrexin, was found that apparently causes the fever that comes with inflammations.

A hormone produced by the pituitary gland in the head, the adrenotrophic factor, was reported to play an important role in body resistance to invasion by disease germs and poisonous substances through influence on the lymphoid tissue.

Drinking large quantities of sodium lactate solution saved victims of shocks in severe burns without the use of blood plasma.

An anti-malaria vaccine was successful in laboratory tests on animals.

An anti-reticulocytotoxic serum was reported effective for stimulating wound healing, suggesting its use as a weapon against cancer, high blood pressure and premature old age.

An airman's ceiling may be raised as much as a mile by eating sugar before flight and



LIKE A SKY ROCKET—Jet-assisted take-off enables the Navy's massive twin-motored Martin Mariner to shoot up from the water rocket-fashion.

refraining from excessive smoking, laboratory tests indicated.

An anti-enzyme substance in beef sweetbreads and soybeans may be a new weapon for fighting certain streptococcal infections, it was reported.

Blood clotting was found to involve changes in molecular shape of the same kind as occur in the contraction of muscle tissues and the elastic stretching of skin and hair.

Streptothricin, germ-killer from a microbe that lives in the soil, promised to become a weapon against dysentery and infected wounds.

Refrigeration of the jaw showed promising results as a pain-killing aid to dentistry with complete loss of sensation obtained in the majority of cases tried.

Successful experiments on high blood pressure in rats pointed toward trials of vitamin K as a high blood pressure remedy.

Finding that there are certain changes in the excretion of hormones following injury suggested new methods of treating the burned and wounded.

The discovery of the presence of certain catalysts known as porphyrins, revealed by the fluorescent glow of white matter in the brain, gave light on the problem of mental disease.

Biotin may have a part in the utilization of starches and sugars by humans, tests of liver slices kept alive outside the body indicated.

A Soviet scientist successfully transplanted the hearts of frogs; some of the animals lived for four months with new hearts completely replacing their own.

A germ-killing soap that may reduce infections was announced.

Radium treatment was tried for the prevention of aviator's ear with good results.

Meals high in starches and sugars or fats were found to help offset the effect of cold weather on body temperature and on the coordination of nerves and muscles.

Phenoxetol, a chemical relative of ethylglycol, was announced as an effective remedy for "blue pus" infection in wounds.

A sulfa drug, sulfamylon, effective against gas gangrene and other anaerobic organisms, was developed.

Increased resistance to oxygen lack at low atmospheric pressure was achieved for rats by dilantin sodium, a drug used in epilepsy, and thiourea and thiouracil, chemicals recently found effective in slowing thyroid gland activity.

Quinacrine (atabrine) was reported to be as good as quinine in control of malaria and even better in some respects.

Encouraging results in treatment of clinical tuberculosis with sulfabenamide, a special kind of sulfa drug, were reported, but the drug was not developed to the point of curing the disease.

Two sets of quadruplets in the rare combination of three girls and one boy, were born in the United States, one set is believed to have been the first quadruplets in medical history delivered by a Caesarean operation; reports of the birth of quintuplets came from Argentina and Turkey.

One of the worst infantile paralysis epidemics since 1916 occurred in the United States with total cases reported for the year expected to be 20,000 or more; influenza was epidemic during the winter of 1943-44.

Experiments with rats led to the hope that

extra doses of B vitamins would improve the promin treatment of tuberculosis.

Riboflavin, one of the B vitamins, was found to be manufactured by bacteria in the human intestinal tract; revision of dietary requirement standards may follow.

Experiments with rabbits, showing that air-borne spread of tuberculosis germs could be stopped by ultraviolet irradiation, suggested a possible aid to the control of human tuberculosis.

The addition of auxiliaries, such as paraffin oil containing dead tuberculosis germs, a related microorganism, *Mycobacterium butyricum* and an absorption base known as Falba suggested a more effective influenza vaccine.

A method was developed for completely and almost instantly killing germs of both bacteria and filterable viruses with ultraviolet light, giving promise of a method of preparing more effective vaccines for some diseases.

Large doses of para-aminobenzoic acid were found effective against louse-borne typhus when treatment was begun during the first week of illness, the course of the disease was made less severe and the average duration of the fever considerably shortened.

A procedure was developed for temporary complete arrest for scientific study of the flow of blood to the human brain, using a specially designed, inflatable, head-pressure cuff, held down to the lower third of the neck; recovery of consciousness occurred quickly.

Whole communities became "guinea pigs" in controlled large scale experiments to determine whether tooth decay can be prevented by adding minute amounts of fluorine to a community's drinking water.

A special solution of the plastic, polyvinyl alcohol, was reported more than twice as effective as plasma in saving rats from dying of experimental shock.

A vaccine, promising to be effective against many strains of dysentery bacilli, was developed.

Electric sleep, differing from electric shock treatment in that it keeps the patient asleep for seven minutes, was announced as a treatment for the mental disease, schizophrenia.

Swift relief of painful muscle spasm and consequent disability in rheumatoid arthritis was reported to follow treatment with prostigmine, synthetic chemical used to treat myasthenia gravis.

Success with sulfaquinidine treatment of Asiatic cholera was said to promise conquest of this ancient plague.

Research showed that the water requirement of the human body cannot, contrary to an old theory, be suppressed by physical conditioning; it was found that a part of the requirement for water in an emergency can be supplied by eating glucose.

Excessive production of the polysaccharide, hyaluronic acid, with failure or insufficiency of the enzyme, hyaluronidase, to break up the big acid molecule, was seen as an important factor in rheumatic fever.

Two vitamins of the B complex group, riboflavin and pellagra-preventing niacin, were reported to be factors necessary for the production and regeneration of the blood in the animal body.

Successful mice experiments led to the hope that toxoplasmosis could be cured by



KEEPS WATER OUT—To guard against the possibility of water in 100 octane gasoline, Douglas Aircraft employs this alternate static vent drain of transparent Tenite plastic in the fuel system of one of its planes. If any water should be present in the gasoline, it is automatically drained to this vent, where it accumulates and regardless of altitude, never freezes.

sulfapyridine.

Tests repeated many times on the same inveterate smokers showed they responded to tobacco with increase in blood pressure and pulse rate, decrease in the temperature of the skin at the extremities, and change in heart rate as demonstrated electro-cardiographically, together with change in the T-wave.

A case of complete pancreatectomy with survival following operation for more than a few weeks was reported; it is the first total pancreatectomy for a benign lesion of the pancreas.

The male sex hormone was found to have an important influence in promoting muscular strength.

Children were found to grow most rapidly in height in summer and in weight in winter; new bone centers in their skeletons appear most rapidly in summer.

Feeding expectant mothers thyroid to make them produce small, easily-born babies was discovered to have the reverse effect, actually producing larger babies.

Clinical studies in America confirmed belief that rubella (German measles), as first noted in Australia, contracted during the first three months of pregnancy produces congenital abnormalities of the eyes and defects of the central nervous system in the offspring.

A condition corresponding to the menopause in women was discovered to occur in some men; it was satisfactorily treated with the male sex hormone.

Delivery by Caesarean of a living baby from each horn of a double uterus in a

mother who also had a complete double birth canal, and the birth of a living baby from an ovarian pregnancy were among unusual obstetrical events.

The 1943 and 1944 Nobel prizes in medicine were awarded to four men: Dr. Henrik Dam and Dr. Edward A. Doisy shared the 1943 prize for the discovery and synthesis of vitamin K; Dr. Joseph Erlanger and Dr. Herbert S. Gasser received the 1944 award for their fundamental research on nerves.

Grants totalling \$1,100,000 were given by Bernard M. Baruch for teaching and research in physical medicine.

The gold medal of the American Academy of Orthopedic Surgeons was awarded to Col. John L. Gallagher for his development of compression dressings for burns, wounds and frostbite.

Establishment of the Passano Foundation to aid medical research and education, was announced.

Discovery that certain hormones and synthetic chemicals may become weapons for fighting tumors of the uterus which develop in women during the child-bearing period won the second \$2,000 Charles L. Mayer Award for Dr. Alexander Lipschutz of Chile.

PSYCHOLOGY AND PSYCHIATRY

Five to 14 Quanta Can Stimulate Retina of Eye

► THE SMALLEST amount of light capable of stimulating the retina of the human eye was found to be between five and 14 quanta, representing an energy expenditure of between two and six ten-billionths of an erg, and often a single quantum is adequate for the effective excitation of a single retinal nerve-cell.

A portable night-vision testing instrument was developed for the Navy which uses a luminous dial, made of radioactive material sandwiched between two disks of glass, against which a test letter is seen in faint silhouette.

Under certain conditions the exact center of the fovea of your eye is partially color-blind, affecting ability to distinguish blue from green, or orange from purple in small objects or those seen at a distance, experiments showed.

Reaction time to a change in intensity of the stimulus was developed as a new psycho-physical method; it was applied successfully to measuring sensation of light.

New types of ear defenders made of synthetic rubber which reduce battle noise without preventing the hearing of commands were made available in the Navy; they protect fighters against painful noise and lessen the chance of deafness; used experimentally in noisy war factories they cut down absenteeism.

Data were found indicating that from one-sixth to one-quarter of feeble-mindedness results from incompatibility reactions between a mother lacking the Rh blood factor and her unborn child who has it.

Which region of the body sends most information to the brain's cortex was found to be related to how the animal habitually obtains its food.

Restraint of physical activity, which causes tic-like head shakes in hens, bears

and other animals, was also found to lead to over-activity and temper tantrums of children.

A battery of 20 psychological tests developed for the selection of aviation cadet candidates was reported to be useful in predicting which would later be successful in combat and which most likely to be missing in action.

Opinion surveys reached a new high in accuracy, predicting the popular vote in the presidential election with an error of only one per cent.

Personal liking for a candidate was discovered to follow rather than precede the decision to vote for him, and change of vote, when it occurs, is due more to the influence of friends than to campaign speeches.

Study of cats made "neurotic" by inner conflict between hunger and fear in experiments to investigate reasons for use of morphine by humans showed that the more recently-learned abnormal behavior patterns disappeared first and reappeared last as effects of the drug wore off.

A case of total color blindness with red seen as black was traced, through hypnotism, to hysteria in the man's childhood; sensitivity to red rays of the spectrum was restored.

By immediate diagnosis of mental casualties and treatment in the front lines, up to 80% of the service men receiving mental or emotional wounds were returned to duty.

A psychiatrist was appointed on the staff of each Army division as an aid in salvaging for combat or other active military duty those who would otherwise crack up mentally under the strains of warfare.

A re-education program set up in three replacement training centers enabled the Army to take out of hospitals a group of soldiers suffering mental or nervous breakdowns and return most of them to full-time jobs.

"Battle reaction" type of war neurosis was successfully treated in merchant seamen with ergotamine tartrate, a drug acting on the autonomic nervous system.

Experience with government employees indicated that in some cases when workers appear to be neurotic, their symptoms may be due instead to inability to meet the demands of the job; better placement may relieve the condition.

Pencil-and-paper tests proved better than practical performance tests for picking radar technicians, airplane mechanics or radio repairmen for army.

Close resemblance was found between non-twin brothers and sisters and evidence indicated that this is due more to heredity than environment.

A combination of hypnosis and psychoanalysis was reported to be a successful treatment for psychopathic criminals where ordinary psychoanalysis would fail due to lack of cooperation on the part of the criminal.

"Three-day schizophrenia," a mental illness like schizophrenia but of brief duration, was reported as developing in combat, but due more to background personality than type of duty.

"Grief reaction" depression following tragic bereavement was treated successfully by electric shock.

A survey of men rejected or discharged by the Army for neuropsychiatric reasons showed that 80% needed psychiatric treat-

ment or advice, but only 5% got it.

A non-profit institution, the Worcester Foundation for Experimental Biology, was established to study problems of industrial fatigue and mental illness, and search for more knowledge of the nervous system and the hormones.

Col. William C. Menninger, chief of the psychiatric division of the Army's Surgeon General's Office, received from the National Committee for Mental Hygiene the new \$1,000 Lasker award for his outstanding contribution to the mental health of service men and women.

Science News Letter, December 23, 1944

ASTRONOMY

Fire-Ball Fragments Near Parkersburg, Illinois

► FRAGMENTS of the fire-ball of Aug. 18, which was seen by hundreds of people in Indiana, Illinois and Ohio, can probably be found in the vicinity of Parkersburg in Richland County, Ill., reports Dr. Charles P. Olivier, director of the Flower Observatory and president of the American Meteor Society.

This is about 15 to 20 miles north of the point where it was originally estimated that the fire-ball ended. In all, about 250 reports were sent to Dr. Olivier by readers of newspapers serviced by Science Service, and it was from these that the path of the meteor was plotted.

The fire-ball, described by some as being bright as the sun, or with a disk as large as the full moon, was at first mistaken by many to be a burning airplane. Robot bombs were in the minds of others upon seeing it.

At first the object was silver-white, then it grew yellow and finally became red as it neared its end. The head of the meteor was oval-shaped, with hot, colored gases, some 10 to 15 times as long as the head's diameter, trailing along with it. The smoke train was not visible at great distances, being only about as intense as sky-writing.

Special "explosions" occurred at two places along its path. The first consisted of the separation of the head into two or three pieces which continued straight on their course. The second point was probably that of general disintegration, the fragments continuing nevertheless some 40 miles.

"I rarely remember handling a case in which, when averaged in, the data so corroborated themselves in the sense that each part of the solution somewhat checked the other parts," stated Dr. Olivier, who coordinated and gave meaning to the miscellaneous information sent to him.

Science News Letter, December 23, 1944

CONSERVATION

Aid for Flooded Holland

► AMERICAN PUMPS and diesel engines to operate them, now being secured in the United States by the Netherlands government, will clear the acres flooded by the Germans, some with sea water. But from five to ten years of scientific treatment of the soil will be necessary before the land flooded by sea water becomes productive again. A much longer time will elapse before fruit and other trees can be planted and reach maturity. The salt water kills practically all vegetation.

Before pumping operations begin, miles of new dikes will have to be built and many other miles repaired. Machinery for this, as well as great quantities of stone, cement and other construction materials, will have to be imported. In addition, great quantities of building materials will be required to restore the cities and homes destroyed by flooding. The Netherlands has suffered a major catastrophe, for without land to till and pasture for their cattle millions of Dutch people must find other means of earning a livelihood.

Between 60% and 65% of the entire population of the Netherlands has been affected by the floods let loose upon the country by the enemy, one Netherlands official stated.

Netherlands Premier Gerbrandy, reporting on flood conditions early in October, declared: "Even more disastrous, from the long-time point of view, is the systematic campaign of inundations and demolitions planned long ago by the German authorities, already partly executed in preceding months and now in the process of being carried to their ultimate conclusion."

"The following figures are based on known German defense plans which

already have been largely carried out and whose execution is still being completed," he said. "Arable land flooded—675,000 acres, or 22 per cent of the total arable land in the Netherlands; pasture flooded—327,500 acres, or 11 per cent of the total pasture in the Netherlands; total flooded—1,000,000 acres, or 17 per cent of the total arable land and pasture. Very considerable parts of these areas have been flooded with salt water as a result of which the land becomes unusable for several years."

Walcheren, the great Dutch island that guards the shipping route to Antwerp, is one of the areas most severely ruined by flooding. There are three great gaps in the dike that surrounds the nearly circular island, and it looks today like a 10-mile dish with a broken rim, filled with dirty seawater.

A new dike about a mile and a half long must be built to plug the gaps. It will take a year to get the island dry, then years to cleanse the soil of the salt. After the flooding of the nearby Zuid-Beveland island in 1906 it took agricultural experts five years to make it fit for cultivation.

All pumping installations on Walcheren, and in other flooded areas, are not completely destroyed but many are without power, and diesel engines have been decided upon as the best power for immediate installation. Walcheren's power station escaped serious damage, but the Germans stole or destroyed the great dredges needed to scrape sand from sea bottom to build the dikes and the machinery to press the sand into place. Orders totaling \$12,000,000 have already been placed in the United States for new pumps, engines and machinery.

Science News Letter, December 23, 1944

Do You Know?

Most *pythons* feed on small mammals and birds.

Plants grown in the same soil may vary in *iodine* content.

Acetone can be made by the fermentation of corn.

Calves, sheep, pigs, horses and poultry are liable to *goiter*.

Blending the juices from different varieties of apples sometimes make a better flavored *cider*.

Unshrinkable *wool fibers* are made by a method of forming synthetic resin within the structure of the fiber.

Certain *lungfish* of Central Africa and South Africa during dry seasons burrow in the mud about 18 inches and secrete a protective cocoon of slime.

The largest *penicillin* factory in the world, under construction in England, will begin production late in 1944, it is expected.

Carrots have a skin-sensitizing principle which is irritating to some persons who come in contact with this vegetable in raw, dried, or heated state.

Wild *fawns* do not follow their mothers for some time after birth; finding a fawn alone does not always indicate that it has been deserted.

Outdoor-grown Mexican *orchids* are now being shipped to the United States by airplanes, arriving in excellent condition.

The average length of American and Orinoco adult *crocodiles*, the two largest species, is from 10 to 12 feet, but specimens of both have been found measuring 23 feet.

The United States, under war conditions, now leads the world in the quantity of *wool textiles* produced; Great Britain is traditionally the world's largest peacetime producer.

A *pet fox* kept chained to a dog kennel and fed bread and milk soon neglected this food but remained in good condition; later it was found that he used the bread and milk as bait to attract barnyard chickens, whose feathers he hid in the kennel.

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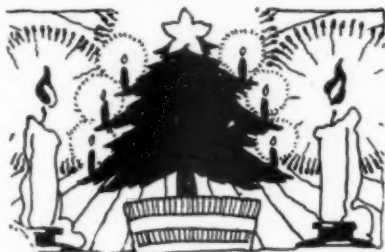
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Live Christmas Trees

► A CHRISTMAS TREE can serve for several Christmases, and be better and bigger each year, if we take the trouble to get a live one and see that it stays alive. And there's no great trick to that, either. Just get a good little fir or spruce, with its roots protected by a compact ball of earth and set it in a tub or heavy basket. Keep it indoors as long as the Yule season lasts, then move it outside until it is needed again next year.

Contrary to a widespread impression, such live Christmas trees are not expensive. John H. Derby, a fire prevention engineer of New York City, states that for several years he has had charge of Christmas decorations in large office buildings, and has been able to secure live five-foot trees at a quantity price of \$2.50 each, including the red-painted tubs or baskets in which they stand. Presumably the retail price per single tree would be higher; but there is still a considerable spread between the figure of \$2.50 and the \$3.50 to \$5 which New York dealers charged for cut Christmas trees of the same size last year.

When the live Christmas tree has served its immediate purpose, it is taken care of by being set in a previously dug pit outdoors, with the burlap-wrapped ball of earth left undisturbed about its roots, and the top guyed against wind pressure. Soil well mixed with manure or compost should be packed in around the ball, and a four-inch depression left at the top, to be filled with water once a week for two weeks, if outdoor temperature remains above freezing.

A tree thus treated is practically certain to survive, and may be brought indoors again a year hence. Or it may be left where it is, to become a part of the permanent plantings around your home. Either way has its own appeal. There is

something intriguing about the idea of having a pet tree that grows up with the children, like a pet dog or pony. On the other hand, if you have space enough in your yard, the family might like to have an outdoor "family" of former Christmas trees, each with its own crop of pleasant memories.

Science News Letter, December 23, 1944

MEDICINE

Rabbit Fever May Yield To New Chemical Remedy

► HOPE THAT rabbit fever, or tularemia, may be successfully treated by a new chemical remedy of the same general type as penicillin appears in a report by Dr. F. R. Heilman of the Mayo Clinic.

The new substance is called streptomycin. It comes from a living organism that is halfway between a fungus and a bacteria, *Actinomyces griseus*, instead of from a mold as penicillin does. Streptomycin was discovered by Dr. Albert Schatz, Dr. Elizabeth Bugie and Prof. Selman A. Waksman of Rutgers-University.

After test tube experiments showed that rabbit fever germs were very sensitive to the action of streptomycin, Dr. Heilman and associates, Miss Nellie Greenburg, Miss Mary Knutson and Miss Beatrice Bennett, gave it to mice that had killing doses of rabbit fever germs in their bodies. Of 30 untreated mice, all died of rabbit fever within 96 hours after being infected. The 30 mice which got daily doses of streptomycin for 10 days all survived.

The results of this study, Dr. Heilman says in his report, suggest "that this drug may be useful in the treatment of tularemia (rabbit fever) in man."

Tularemia, he also points out, is a widespread disease, killing from 3 to 5 of every 100 persons it attacks. Even when it does not kill its victims, they are sick from four weeks to several months. A serum has been developed which helps in some cases, but the serum itself has caused illness in as many as half the patients. Neither penicillin nor sulfa drugs has been effective as a remedy.

Science News Letter, December 23, 1944

ZOOLOGY

Old-World Chameleons Arrive at Washington Zoo

► THREE OLD-WORLD chameleons, with parrot toes and monkey tails, have

been added to the collection in the reptile house of the National Zoological Park in Washington. They come from the province of Algarve, in Portugal. They arrived by air express, having been sent by George Constantinides, formerly head gardener at the Zoo, now employed by the American embassy in Lisbon. Director William M. Mann of the Zoological Park stated that they seemed a trifle chilled and stiff at first, but soon perked up and made themselves at home.

Old-World chameleons are quite unlike the little lizards that are sold to Florida tourists as chameleons. They are much larger, and belong to a different reptilian family. They are especially well adapted to hanging onto things. The four toes on each foot are paired, two pointing backward, two forward, like a parrot's. The tail is prehensile, like a monkey's. The lightning-like tongue is extraordinarily long; it can snap up an insect about the animal's whole body-length away.

Most extraordinary feature, perhaps, are the chameleon's eyes. They are swivel-mounted, turning freely in any direction. More than that, they are independent of each other: one eye can be trained dead ahead while the other is looking squarely on the beam, directly overhead, or even astern.

Science News Letter, December 23, 1944

WANTED

AN UNUSUAL PERSON FOR A VERY SPECIAL JOB

The Director of THE MESA VERDE EXPLORERS' CAMP FOR BOYS needs a secretary—someone specially qualified by temperament and experience to fill this unique post. Applicant must be proficient in shorthand, typing, and simple bookkeeping; should be able to frequently write letters following sketchy memos, to build up and maintain contacts with young explorers and their parents, to meet the public well during the summer months in Mesa Verde National Park.

It is important that the person chosen for this assignment be enthusiastic about outdoor life and capable of enjoying living in a small mountain community in Colorado during the winter months and in Mesa Verde National Park during the spring and summer. Please don't apply unless you are perfectly content to substitute hiking, horse-back riding, reading, etc., for the more artificial urban types of recreation.

Applicant must be ready to start service immediately helping with Explorers' Camp 1945 membership campaign and remaining at least until end of next summer for service in Mesa Verde and the La Plate Mountains. Beginning salary \$125.00 per month plus board and room during summer months in Mesa Verde National Park.

This assignment demands someone with unusual talents, a spirit of adventure, and personal initiative. If you qualify, please send photo and description of qualifications to:

ANSEL F. HALL

Director, Mesa Verde Explorers' Camp for Boys, Mancos, Colorado

AGRICULTURE

Food Shortage in Germany

If able to hold out against conquest during the winter, she will have reason to worry about food for the future, with her sources severely cut down.

► GERMANY, if able to hold out against conquest throughout the winter, will have reason to worry about food for the future, as her prewar stores of grains and meats are probably exhausted and she has now no sources of food except what can be raised in the Reich itself or in the small portions of adjacent nations that may still be under Hitler's control, such as northern Italy, Denmark, Norway, and western Poland and Czechoslovakia.

The German people have been better fed up until now during this war than they were in 1917-18, according to various sources of information. Hitler prepared for the war during a preceding decade by an actively enforced program to increase the production of farms within the Reich by home gardens, intensive agriculture, scientific farming, increased acreage, heavy fertilization and other means, and in 1938 home production was meeting approximately 85% of the total requirements of the nation.

Also, beginning in 1937, Germany purchased and stored for future use great quantities of grains, fats, sugar and other preservable foods. It also stored large quantities of commercial fertilizers other than phosphates to be used during the planned war to keep up a home production of plenty.

Food supplies taken from the conquered countries during the past five years, added to that in storage, made most articles of subsistence available even if home production decreased somewhat because of a shortage of manpower and machinery. The future food situation for the German people seems now to be beginning to resemble the situation in 1918.

The Balkan states, including Bulgaria, Romania, Hungary and Czechoslovakia, have been for four years Hitler's principal granaries, contributing, voluntarily or involuntarily, huge quantities of wheat, barley, rye, oats, corn and other grains both for human consumption and for cattle feed to keep up the Reich milk yield.

These countries contributed, also, great quantities of potatoes, beans, peas, beet sugar, soybeans, and table oils made from rapeseed and sunflowerseed. They sent the Fatherland cotton, flax, wool and hemp for clothing and rope, together with fruit, raisins, wine and tobacco for Hitler's nourishment and comfort. Livestock raised in this area supplied the Germans with beef, pork and mutton.

The principal contributions to the Nazi food supply from Denmark, Belgium and the Netherlands, were pork and dairy products. France supplied the Germans with grains, potatoes, sugar, dairy products, poultry, eggs, meat, wines and table oils. Italy's contributions were about the same, but included quantities of nuts and fruit from the northern area, and prior to the Allied occupation of southern Italy, citrus fruits and products, olives and olive oil.

Norway and Finland shipped into the Reich potatoes and grain and considerable meat. Poland and the Baltic states sent potatoes, corn, small grains, beet sugar, vegetables and meat. The Baltic

states raise hens and bees and from them Hitler obtained much poultry and eggs, as well as honey.

Science News Letter, December 23, 1944

PHARMACOLOGY

Antidote in Dose Makes Curare Use Safer

► SAFER ADMINISTRATION of one of the most widely used of drugs, the potent but dangerous d-tubocurarine, is indicated as possible through experiments on laboratory animals reported by Prof. Theodore Koppányi and Dr. Earl Vivino of Georgetown University School of Medicine (*Science*, Nov. 24).

D-tubocurarine is the purified active principle of curare, originally known as a deadly arrow poison used by South American Indians. It acts primarily by making the muscles powerless. In minute doses it has been found highly useful in situations where muscular relaxation is needed, especially in preventing dangerous convulsions during metrazol shock treatment of mental patients, and in connection with gas anesthesia now widely used in surgery. While highly beneficial in the majority of cases, d-tubocurarine has undesirable effects on some sensitive patients, and has even resulted fatally in a number of cases.

Prof. Koppányi and Dr. Vivino tried mixing the alkaloids physostigmine and neostigmine, known to be antidotes for curare poisoning, with the curarine before injecting it into the blood streams of their experimental animals. In suitable amounts, this prevented ordinarily lethal doses of d-tubocurarine from producing death. Addition of ephedrine along with the antidotes was found to increase their efficacy in some cases, though ephedrine alone is not effective against curare poisoning.

Another possible significance of the experiments is suggested by the two Georgetown physiologists. The muscle paralysis in curare poisoning resembles in some ways the muscular impotence occurring in the serious disease known as myasthenia gravis. Prof. Koppányi and Dr. Vivino suggest that the curare antidotes be tried out clinically in the proportions as used in the animal experiments, and together, for the treatment of this disease.

Science News Letter, December 23, 1944

Ball bearings, often called anti-friction bearings, are used in many types of war machines; they are balls of steel, shaped and polished to 1/200,000 of an inch, the last word in precision fitting.

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ENGINEERING

Light Structural Column

► A NEW TYPE of structural column of concrete and steel, developed in the Technological Institute of Northwestern University for use in high buildings and long-span arch bridges, has light weight and great strength and probably will be used widely in the future in place of more costly steel columns. It is a type of a reinforced concrete compression unit, with about 15% by volume of steel and 85% by volume of concrete, which is about as heavy as aluminum and stronger than solid structural steel.

The column consists of extremely high-strength concrete wrapped about with a high-strength spiral steel wire, which is always under tension, to form a core which is then covered with a fireproofing concrete. An eight-inch core with two inches of fireproofing concrete covering will take a safe load of 1,000,000 pounds, it is claimed. In laboratory tests it carried a load of 2,500,000 pounds, and at this load the elastic limit of the steel had not been reached.

The new type of structural column was developed under the direction of George A. Maney, chairman of the university's department of civil engineering, in a program of finding new materials to meet critical needs sponsored by the War Production Board.

"The features that distinguish the new type of column from the ordinary spirally reinforced concrete column," Prof. Maney says, "are, first, an extremely high-strength concrete, and, second, a spiral wrapping in which the steel is always under tension even though there is no load on the column. The latter feature is extremely important in that it permits the restraining steel spiral to act as soon as any load is applied, whereas, in an ordinary reinforced concrete

column this is not the case."

This result is accomplished by using a very small amount of water and applying a great pressure to the concrete unit while it is being compressed. The unit is not difficult or expensive to make and requires only ordinary plant equipment except for the press that applies the load. The cost, according to Prof. Maney, is estimated at about one-third that of a steel column.

Science News Letter, December 23, 1944

AERONAUTICS

Tree-Fresh Dates Sold Day After Being Picked

► A SHIPMENT of tree-fresh Arizona dates, picked on a Tuesday near Phoenix, Ariz., went on sale in Tennessee on a Wednesday, inaugurating the commercial shipment of fresh produce by air to any point in the South. Regular consignments totaling 5,000 pounds of the highly perishable fruit will be received in Tennessee daily, as well as in New York, in coming weeks.

The fresh dates are a delicate variety usually consumed near the producing area because they spoil rapidly. The dates are being harvested from the groves of the Clarence W. Pruitt farm at Phoenix, washed, packed and put aboard an American Airlines airfreighter the same day. They are flown overnight to the East and delivered to stores immediately upon arrival.

The dates are being offered in nine-ounce packages at 65 cents and in three-pound boxes for \$2.49. The shipment of perishable foodstuffs from the West Coast to the East by air is forging between the grower-farmer and the consumer a new link which promises to bring to the homes of America fresh foods of greater variety and finer quality.

As airlines are able to make more non-priority space available, other products such as tree-ripened oranges, grapes, and fresh-caught seafood will be offered to housewives in most parts of the country.

According to Kenneth Reeves, representative of A & P Food Stores, chain food stores all over the country will offer a wider variety of foods to housewives after the war as a result of air-shipment of produce. Farmers whose outlets have been limited to nearby communities will

be able to find new and bigger markets by shipping their products by air.

Science News Letter, December 23, 1944

MEDICINE

Radium and X-Ray Used For Removing Birthmarks

► SEVERAL ways of removing those distressing and often disfiguring blemishes known as birthmarks have been reported.

Radium treatment gives the most uniform and best cosmetic results, although X-ray treatments have also been tried, in the opinion of Dr. G. E. Pfahler of Philadelphia. The cavernous and strawberry types of birthmarks respond satisfactorily to irradiation treatment but the port wine types do not, he finds. Dr. Pfahler has also used electro-surgery in selected cases. He stated that others have reported good results with carbon dioxide snow and injection treatments of birthmarks.

The advantages of X-ray treatment of these marks, which are tumors of new-formed blood vessels, were reported by Dr. James V. Prouty, of Cedar Rapids, Iowa.

The development of shock-proof apparatus and accurate measuring instruments, he pointed out, have overcome the dangers of electrical shock and over-exposure which formerly caused objection to the use of X-rays for treating these tumors.

Science News Letter, December 23, 1944

MATHEMATICS DICTIONARY

Second Printing, Second Edition

American Library Association's Subscription Books (encyclopedias, dictionaries, etc.) Committee says in Subscription Books Bulletin, Oct. 43: "In its subject field there is no work directly comparable to the Mathematics Dictionary. Because of its usefulness to anyone seriously interested in mathematics, the volume is recommended for personal, school or library purchase. For those already possessing the 1942 edition, purchase of the 1943 edition is suggested only if the dictionary is extensively used or a second copy is desired." Send \$3.00 to Digest Press, Department 3B, Van Nuys, California, or Science News Letter.



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Books of the Week

► TVA ONCE CONNOTED a considerably disputed program for the reclamation of a Southeastern inland empire and the social rehabilitation of its people. That phase has been largely lost in the enormous contributions to the war effort made possible by the great development of electric power from its staircases of dams. The story is briefly but vividly told from the beginning, in *THE VALLEY AND ITS PEOPLE*, by R. L. DuRoi and Charles Krutch (*Knopf*, \$2.75).

Science News Letter, December 23, 1944

► ALTHOUGH AMONG the youngest of specialized branches of the armed services, the Navy's Construction Battalions ("Seabees") have already become figures of legend and glamor. Stories of their exploits are well told by Hugh B. Cave, in *WE BUILD, WE FIGHT!* (*Harper*, \$2.50).

Science News Letter, December 23, 1944

► NIKOLA TESLA, one of the strangest geniuses who ever lived and worked in America, died in New York only a short time ago. In *PRODIGAL GENIUS*, John J. O'Neill, science editor of the New York Herald Tribune, long an admirer of Tesla's, gives us his first biography (*Washburn*, \$3.75).

Science News Letter, December 23, 1944

► BOTANISTS, as well as students of the history of science, will welcome *Chronica Botanica's* reprinting of *A LIFE OF TRAVELS*, C. S. Rafinesque's autobiography and one of his rarest works—so rare, indeed, as to be almost inaccessible in the original edition (\$2.50).

Science News Letter, December 23, 1944

► SINCE WE have suddenly become the world's first naval power, Americans are much more conscious of weather at sea than

they once were. Which gives timeliness to the publication of a new edition of I. R. Tannehill's *HURRICANES, THEIR NATURE AND HISTORY* (*Princeton Univ. Press*, \$3).

Science News Letter, December 23, 1944

► IN A BIOGRAPHY of a great psychoanalyst written by another psychoanalyst you would expect to find a keen analysis of character and genius. But in Dr. Hanns Sachs' "FREUD: Master and Friend" we also have the warm account of the building of a friendship. We are taken into the home as well as the lecture room to listen to intimate discussions, epigrammatic descriptions of friends. We learn how Freud worked, how rapidly he answered letters, how many hours a day he spent with patients. And finally we hear the details of his tragic removal from Vienna with the coming of the Nazis and his death. (*Harvard Univ. Press*, \$2.50)

Science News Letter, December 23, 1944

Just Off the Press

ALEUTIAN ISLANDERS, Eskimos of the North Pacific—George I. Quimby—*Chicago Natural Hist. Museum*, 48 p., paper, illus., 35c.

AMERICAN ANNUAL OF PHOTOGRAPHY, 1945, vol. 59—Frank R. Fraprie and Franklin I. Jordan, eds.—*Am. Photographic Pub.*, 200 p., paper, illus., \$1.50.

ATLAS OF THE BLOOD IN CHILDREN—Kenneth D. Blackfan and others—*Commonwealth Fund*, 320 p., illus., \$12.

THE CENOZOIC BRACHIOPODA OF WESTERN NORTH AMERICA—Leo George Hertlein and U. S. Grant IV—*Univ. of Calif. Press*, 236 p., paper, illus., \$3.

DIFFERENTIAL AND INTEGRAL CALCULUS, an Introductory Course for Colleges and Engineering Schools—Lorrain S. Hulbert—*Barnes & Noble, Inc.*, 282 p., \$1.50.

EARLY MAN AND PLEISTOCENE SCIENCE IN SOUTHERN AND EASTERN NORTH AMERICA—Hallam L. Movius, Jr.—*Peabody Museum*, 125 p., paper, illus., \$3.75 (Paper, vol. XXIX, no. 3).

ELEMENTS OF BACTERIAL CYTOLOGY—Georges Knaysi—*Comstock Pub. Co.*, illus., \$3.50.

LARGE SCALE RORSCHACH TECHNIQUE—Manual for the Group Rorschach Multiple Choice Test—M. R. Harrison and M. E. Steiner—*C. C. Thomas*, illus., \$8.50.

METALS AND ALLOYS DICTIONARY—Merle L. Sobel—*Chemical Pub. Co.*, \$4.50.

NUTRITION WITH SENSE—Eleanor Barrows, 222 p., \$2.

PLANE AND SPHERICAL TRIGONOMETRY WITH ANSWERS AND TABLES—Taylor—*Barnes & Noble, Inc.*, \$1.50.

RACIAL PREHISTORY IN THE SOUTH AND THE HAWAIIAN ISLANDS—Carter—*Peabody Museum*, 37 p., paper, (Paper, vol. XXIII, no. 1).

ROOT DISEASE FUNGI, a Treatise on the Epidemiology of Soil-borne Diseases of Crop Plants, and a First Exposition of Principles of Root Disease Control—Garrett—*Chronica Botanica*, 177 p., \$4.50.

Science News Letter, December 23, 1944

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Question Box

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